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MASTER OF MILITARY STUDIES

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**TITLE:**  
**RESTRUCTURING THE HMLA TO OPTIMIZE SUPPORT TO THE MAGTF**

SUBMITTED IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF MILITARY STUDIES

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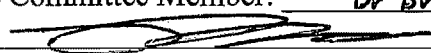
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## **Executive Summary**

**Title:** Restructuring the HMLA to Optimize Support to the MAGTF

**Author:** Major Andrew W. Kellner, USMC

**Thesis:** The Marine Corps needs to evaluate the contribution of the Marine Light Attack Helicopter (HMLA) Squadron and HMLA Marine Expeditionary Unit (MEU) detachments towards defeating the most likely forecasted security threat and reorganize in accordance with the President's strategic guidance for DoD, writ large, and Marine Corps, specifically.

**Discussion:** The Aviation Combat Element (ACE) of the MEU Marine Corps must be prepared to support the Marine Air Ground Task Force across the full range of military operations. In accordance with President Obama's most recent strategic guidance, the most likely scenarios for employing the MEU are in limited scale peace-keeping, HA/DR, and anti-piracy operations. All of these mission sets are ideally suited for the UH-1Y and the ACE should be properly equipped to conduct these most-likely mission sets. The UH-1Y has the capability to conduct light and short range assault support missions freeing up the MV-22B and CH-53E to perform missions that maximize their unique capabilities. Additionally, with APKWS II the UH-1Y can autonomously deliver laser guided rockets in an Offensive Air Support mission.

**Conclusion:** Therefore, a recommended change to the ACE is to deploy with four AH-1Zs and five UH-1Ys. In order to create space for the additional 'skid' aircraft the MEU should deploy with ten MV-22s and still retain the ability to conduct a company-sized lift. Finally, in order to deploy more UH-1Ys on the MEUs the HMLA structure will need to change. During this transition period from AH-1Ws to AH-1Zs the Marine Corps has a unique opportunity to right-size the HMLA to counter the most likely threat and match our capabilities appropriately. A change from eighteen AH-1Ws to twelve AH-1Zs and increasing from twelve to fifteen UH-1Ys in the HMLA results in detachments of four AH-1Zs and five UH-1Ys and optimizes the HMLA's contribution to the MAGTF.

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## *Preface*

From 2003 to 2011, while serving within an HMLA as an AH-1W pilot and filling various billets within infantry units, I gained a unique appreciation for MAGTF operations. This paper is my attempt to make a non-parochial assessment of the HMLA's contribution to the MEU and MAGTF.

I would like to thank the faculty of the Marine Corps Command and Staff College, particularly Dr. Paul D. Gelpi for his guidance and mentorship with this paper. I would also like to acknowledge the USMC Research Library and the Leadership Communications Skills Center for their assistance. Finally, I would like to express my gratitude to my wife for her support during this endeavor and the entire academic year.

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## The Changing Security Environment

The Marine Corps, as the nation's force in readiness, must have the versatility and flexibility to deal with a situation at any intensity across the entire spectrum of conflict.<sup>1</sup>

### MCDP-1 Warfighting

In his 2012 strategic guidance, President Obama charged the Department of Defense (DOD) to create a military that is "agile, flexible, and ready for the full range of contingencies."<sup>2</sup> The defense strategy emphasizes "rebalance and reform" and "deficit reduction through a lower level of defense spending."<sup>3</sup> Additionally, the U.S. military will focus on the Asia-Pacific region and lead efforts to ensure global commons remain accessible for trade while maintaining the ability to "counter terrorism and irregular warfare; deter and defeat aggression; maintain a safe, secure, and effective nuclear deterrent; and defend the homeland."<sup>4</sup> Thus, the President has charged DOD with operating across a range of missions while reducing the "cost of doing business."<sup>5</sup>

### *Marine Corps Vision and Strategy 2025 (MCV&S 2025)*

reinforces the DOD strategy of "right-sizing the force" with a mandate to create an Expeditionary Naval Force that is "lean, versatile, flexible, and ready" to react across the range of military operations.<sup>6</sup> The Marine Corps must be capable of conducting "complex expeditionary operations in the urban littorals and other challenging environments."<sup>7</sup> According to

MCV&S 2025, the most likely form of conflict facing the United States are hybrid threats created by states, proxy forces, armed groups conducting a "blurring" of conventional war, irregular challenges, terrorism, and criminality.<sup>8</sup> The most probable operational environment will be urbanized and densely populated within 125 miles of the coastline.<sup>9</sup>

The Marine Corps should evaluate the contribution of the Marine Light Attack Helicopter (HMLA) Squadron and HMLA Marine Expeditionary Unit (MEU) detachments towards defeating the most likely security threat and reorganize in accordance with the President's strategic guidance for DoD, writ large, and Marine Corps, specifically.

#### **MEU and HMLA Background**

The number of deployed forces and the challenging terrain make it imperative the Department focus on rapidly increasing the number and quality of key enablers--fixed- and rotary-wing lift...

*Quadrennial Defense Review Report, February 2010*

The MEU is a Marine Air Ground Task Force (MAGTF) constructed around a ground combat element (GCE) of a reinforced infantry battalion, an aviation combat element (ACE) consisting of a reinforced helicopter squadron, a task-organized logistics combat element, and a command element.<sup>10</sup> The MEU's mission is to provide a forward deployed, flexible MAGTF capable of conducting amphibious operations, crisis response, and limited contingency operations, to include enabling the introduction of follow on

forces and designated special operations.<sup>11</sup> The HMLA supports MAGTF Commanders by providing offensive air support, utility support, armed escort and airborne supporting arms coordination, day or night under all weather conditions during expeditionary, joint, or combined operations.<sup>12</sup>

Marine Corps operations from Vietnam through Desert Storm led to the current ratio of Cobra and Huey aircraft in an HMLA. The UH-1E single-engine Huey was used by the Marine Corps in Vietnam to perform multiple missions including troop transport, casualty evacuation, armed reconnaissance, and Forward Air Control (Airborne). The desire for additional firepower and a dedicated armed escort helicopter spurred the Marine Corps to adopt the US Army's AH-1G Cobra in 1969 as an interim measure. Subsequent advances in engines, weapon systems, and transmissions led to the UH-1N, UH-1Y and the AH-1J, AH-1T, AH-1W, and the AH-1Z, all of which are twin-engine aircraft developed specifically for the USMC to conduct shipboard operations.

In 1986 the Marine Helicopter Attack (HMA) Cobra squadrons and the Marine Helicopter Light (HML) Huey squadrons were combined into HMLAs to save on manpower and support equipment costs. The Primary Aircraft Authorized (PAA) was twelve AH and twelve UH aircraft. During the First Gulf War, as anti-armor missions took priority there was a shortage of AH-1s to conduct

assault support escort.<sup>13</sup> Due to the Huey's airspeed limitations it was not considered suitable to conduct escort operations and the demand for AH-1s grew. Consequently the HMLA PAA adjusted to eighteen AH-1s and nine UH-1s. The 18/9 mix HMLA was typically employed as a whole squadron or divided into three detachments of six AH-1s and three UH-1s.<sup>14</sup>

The H-1 Upgrade Program is the Marine Corps program of record (POR) to upgrade from AH-1Ws to AH-1Zs, and UH-1Ns to UH-1Ys. The UH-1Y will achieve Full Operational Capability (FOC) in the fourth quarter of FY 2014 and the AH-1Z is scheduled for FOC in the second quarter of FY 2020. As a result of the Marine Corps 202K expansion, the H-1 Upgrade POR adjusted to 349 aircraft due to HMLA growth to nine active duty and one reserve squadron. The most recent Force Structure Review Group adjustments resulted in eight active duty and one reserve HMLA squadron. Due to increased utility helicopter demand from the GCE, the Marine Requirements Oversight Council (MROC) determined in August 2010 that fifteen AH-1Zs and twelve UH-1Ys per squadron supports the MAGTF better than eighteen AH-1Zs and nine UH-1Ys.<sup>15</sup> Consequently, the Primary Aircraft Authorized (PAA) for an HMLA are eighteen AH-1W and nine UH-1Y until a squadron transitions to AH-1Zs, at which point the PAA adjusts to fifteen AH-1Zs and twelve UH-1Ys.

The complementary nature of the AH-1Z and UH-1Y extends beyond airframe designs. The upgraded AH-1Zs and UH-1Ys have 84% identical major components which enhances deployability and simplifies maintenance efforts by reducing logistics and training requirements for mechanics. Additionally, when employed as a mixed section, the Yankee and Zulu tactically and operationally complement each other, which provides increased lethality, mobility, and flexibility to the MAGTF commander. The Zulu has four universal wing stations to carry rockets or up to 16 laser-guided Hellfire missiles and two AIM-9 air-to-air Sidewinder stations in addition to a 20mm cannon that slews just over 90 degrees left or right. Additionally, the Zulu's Target Sighting System (TSS), a third generation forward looking infrared sensor (FLIR), provides situational awareness and the ability to maintain a farther distance from targets. While the Zulu's ordnance is primarily forward-firing, the Yankee enjoys nearly 360 degrees of weapons coverage. The UH-1Y complements the AH-1Z by providing additional observers, quick and accurate threat suppression, an embedded tactical recovery of aircraft and personnel (TRAP) vehicle, and casualty evacuation capabilities. The Yankee can carry 2,000 pounds of cargo in addition to fuel, weapons, ammunition, and a four-man aircrew. If missions require, over 3,000 pounds of cargo can be flown while reducing fuel, weapons, or ammunition. The upgraded AH-

1Zs and UH-1Ys now enjoy similar airspeeds, ranges, and on-station time capabilities in addition to complementary weapons systems and sensors which makes them "lean, versatile, and flexible." (See Appendix A)

#### **Current MEU and HMLA Issues**

We focus upon multi-mission capabilities. Every platform out there has to be multi-mission. It cannot be single-mission. That doesn't mean that you have to be able to do every mission 100-percent. But you need to be able to do a significant percentage of every mission that's out there.

Col. Roy Osborn, former 15th MEU Commander

As the Marine Corps right-sizes itself in the face of new security and fiscal challenges, there is a requirement to re-evaluate the HMLA's contribution to the MAGTF based on tomorrow's security requirements and aircraft capabilities. Currently, there are 133 AH-1Ws in inventory that will upgrade to AH-1Zs. Additionally, the Marine Corps is purchasing 62 Zulu Build New (ZBN) aircraft according to the Marine Corps Aviation Plan 2011. As AH-1W airframes rotate off the flight line for remanufacturing into AH-1Zs, the number of aircraft per squadron will be reduced to approximately twelve aircraft through FY 2014. (See Appendix B) Although the HMLA community perceives a shortfall of three AH-1Zs per squadron, the deficit is acceptable because of the overlapping missions with the UH-1Y.

The Marine Corps Task List (MCTL) assigns an HMLA seventeen tasks of which nine are common to the AH-1 and UH-1.

Additionally, the MCTL assigns the UH-1 nine unique tasks and the AH-1 two unique tasks. Together, the HMLA accomplishes all six functions of Marine aviation and can perform all missions listed in the METL.<sup>16</sup> Currently, the HMLA squadrons and MEU detachments are weighted towards supporting Phase-3 kinetic operations with more Cobras than Hueys. Restructuring with an increase in UH-1Ys will permit the HMLA squadron and MEU detachments to accomplish all required tasks and prepare for diverse threats and mission sets.

As the Marine Corps attempts to "lighten the ACE" that supports the multi-capable MAGTF, it is prudent, given the current fiscal environment, to purchase aircraft that can perform multiple missions.<sup>17</sup> Of the mission essential tasks (METs) assigned to other platforms of the ACE (e.g. MV-22s, CH-53s, AH-1s), only three are not assigned to the UH-1Y as well. (See Appendix C) The UH-1Y is a versatile multi-mission platform that gives the MAGTF commander flexibility to maneuver units throughout the battle space while retaining a capability to control and deliver fires. Additionally, the open UH-1Y production line presents an opportunity to increase the PAA of UH-1Ys per squadron from twelve to fifteen and decrease the number of AH-1Zs from fifteen to twelve.

A change to the HMLA structure will have an impact on other ACE aircraft missions and requirements. Conversely, changes

within the ACE's medium lift community effect the HMLA. The MV-22 is replacing CH-46s at a rate of two squadrons per year and the Marine Corps will completely transition the HMM to VMM in 2017. The MV-22 has the capability to carry twenty-four troops or 10,000 pounds of internal cargo, a 325 nautical mile combat radius, a cruising speed of 240 knots, and can fly at altitudes above the threat systems associated with irregular forces (small arms, man-portable air-defense systems, etc).<sup>18</sup> However, in the terminal landing environment the MV-22 is vulnerable to these threats like a traditional helicopter.

The MV-22 was designed to support the Operational Maneuver from the Sea (OMFTS) concept. The over the horizon capability has obvious advantages, but currently there are not complementary airframes to provide mutual support or armed escort. Additionally, a force delivered and supported by MV-22s could be limited in fire support platforms.<sup>19</sup> Despite this shortcoming, MAGTF commanders will maximize the capabilities of the MV-22 to expand their operational reach. Using the MV-22B or the CH-53E for missions within UH-1Y capabilities sub-optimizes their availability for long-range medium and heavy lift missions.<sup>20</sup> Consequently, with an increased demand for assault support capability comes an increased demand for light lift, and the UH-1Y is a perfect fit to conduct light lift missions.

Secretary of Defense Gates expressed a desire for "a broad portfolio of military capabilities with maximum versatility across the widest possible spectrum of conflict," which the Yankee/Zulu team provides.<sup>21</sup> A mixed division of three UH-1Ys and one AH-1Z demonstrates the versatility of the Yankee/Zulu team. This aircrew could initially be tasked with conducting a twenty-four man insertion or resupply mission and quickly be re-tasked to conduct close air support. The configuration options for the Yankee allow it to conduct a varied range of missions either simultaneously or sequentially. The Yankee can provide high-volume defensive fires with .50 cal and 7.62mm ammunition in the landing zone environment or offensive fires with fourteen 2.75" rockets. Meanwhile, the AH-1Z can deliver armor-piercing precision fires with sixteen Hellfire missiles, 2.75" rockets, and 20mm cannon if required.

The Advanced Precision Kill Weapon System II (APKWS) adds a precision guided munitions (PGM) capability to the UH-1Y without sacrificing the ability to perform the full spectrum of utility missions. APKWS II is an inexpensive system providing low collateral damage in precision engagements against soft and light armor targets. The APKWS semi-active laser guidance kit is compatible with the existing inventory of rocket motors, warheads, and fuses. However, the additional weight of the laser guidance kits will require a reduction of 1 or 2 rockets,

depending on warhead type, per wing to avoid over-stressing the defensive armament system weight limitation. APKWS II recently successfully fired rockets from a UH-1Y in testing for fielding in late 2012.<sup>22</sup>

In addition to the ability to deliver precision guided munitions with APKWS II, the UH-1Y will receive the same digital interoperability upgrades as the AH-1Z. Both upgraded H-1s have funded programs that will enable Digitally Aided Close Air Support (DACAS) in which digitally transmitted mission information auto-populates moving maps in the aircraft, is displayed on helmet monitors, and can slave sensors to targets. In order to improve aircrew situational awareness, validate targeting accuracy, and maintain positive identification of targets, the Yankee and Zulu are funded to be upgraded with the ability to send and receive Full Motion Video (FMV). FMV sensor imagery can be sent or received from any other USMC platform or ground station, including naval shipping, and incorporates metadata, or location and elevation information. FMV can reduce collateral damage and fratricide concerns. Finally, both the AH-1Z and UH-1Y will be integrated into the Joint Battle Command-Platform (JBC-P), which shares and displays friendly positions, fire support coordination measures, and still imagery. This next generation blue force tracker provides a common operational picture and an over-the-horizon data link

capability. The UH-1Y equipped with APKWS that has the ability to conduct DACAS, share FMV, and is linked into the JBC-P is truly a multipurpose aircraft that can perform armed escort, fire support, or lift missions throughout the battle-space.

The Marine Corps' forecasted battle space will place increased emphasis on dispersed and decentralized operations, which increases demand for assault support to carry smaller cargo to more locations.<sup>23</sup> The future available options will be limited to the MV-22, CH-53E, and UH-1Y. There are three significant issues with employing MV-22s and CH-53s to perform traditional light and medium lift missions: rotor downwash, cost, and risk.

Rotor downwash is directly related to the amount of lift the rotor blades are required to create for an aircraft to fly. The heavier the aircraft, the more lift required for flight, and consequently, the more downwash created. For perspective, the maximum gross weight (MGW) for the MV-22 is 60,500 pounds, the CH-53E MGW is 73,500 pounds, and the UH-1Y MGW is 18,500 pounds. Additionally, the length of the rotor system affects the rotor downwash, measured in air pressure. The comparatively short rotor blades of the MV-22, at 38 feet in diameter, concentrate this air pressure over a small area. Consequently, the Osprey "is not as good as a [CH-]46 for doing austere landings and doing rope operations of any kind of hover operations."<sup>24</sup>

The CH-46E has been used for relief efforts for decades, often delivering supplies in zones that a CH-53E or MV-22 could not use due to the enormous amount of rotor downwash created. The UH-1Y should assume this mission in areas the MAGTF is delivering supplies in order to prevent damage in the vicinity of landing zones. As the widest helicopter in the ACE, the MV-22 is more restricted in the number of places it can land. Additionally, individual ACE standard operating procedures typically restrict mixing MV-22s with traditional helicopters in the same landing zones due to brownout and rotor downwash precautions. This is alarming considering the complex urban terrain the Marine Corps is forecasted to operate within and the GCE's understandable desire to build combat power in the landing zone as quickly as possible. (See Appendix D)

The UH-1Y costs one third of a MV-22 to build, has significantly lower maintenance man-hours per flight hour (MMPFH) requirements, and a lower cost per flight hour (CPFH) which cannot be ignored when determining the most efficient asset for light and low-end medium lift missions in a budget-constrained environment. The MV-22 costs approximately \$65 million per airframe while each UH-1Y costs approximately \$23 million. In helicopter mode the MV-22 consumes 3.5 times more fuel than a UH-1Y.<sup>25</sup> The MV-22 averages twenty MMPFH, the CH-53E averages twelve, and the MMPFH for the Yankee is approximately

three. The CPFH of a CH-53E is \$11,330 and \$10,806 for an MV-22 whereas it is \$3,420 for a UH-1Y.<sup>26</sup> The cost analysis for production, operation, and maintenance reveal that the UH-1Y is the most fiscally responsible asset to perform light and low-end medium lift missions. (See Appendix E)

Risk is another factor the MAGTF commander will consider while determining which asset is most appropriate in the lower end of the medium lift missions. While MV-22 offers twice the speed, five times the range, and three times the payload of the CH-46E it replaces, in the terminal landing zone environment it is susceptible to enemy fire.<sup>27</sup> The MV-22 has a rear-mounted ramp gun for self defense (the belly mounted GAU-17 must retract for landing) and lacks the ability to defend its flanks. There is a stark comparison between a high-value, poorly defended MV-22 and armed UH-1Ys escorted by AH-1Zs providing assault support in a potentially hostile landing zone. As long as the tactical scenario allows for the speed differential between the MV-22 and the UH-1Y, and range is not a factor, then the number of assault support missions are going to increase for the UH-1Y.

In fact, the UH-1Y is supporting the full spectrum of utility missions in Operation Enduring Freedom and during MEU deployments. One third of the mission tasking for the UH-1Y in OEF is assault support. Due to increased utility demand from the GCE, nine OEF UH-1Ys averaged 3100 flight hours, tripling

continental US-based operating levels.<sup>28</sup> Meanwhile, MEU-based UH-1Ys support autonomous and distributed ACE operations.

The traditional MEU/Amphibious Ready Group (ARG) has recently practiced 'split ARG' operations where the ARG disaggregates into mini-MAGTFs. The 13th MEU recently conducted split ARG operations for most of their seven month deployment in support of theater security cooperation (TSC) and counter-piracy operations.<sup>29</sup> Each element of the split ARG "provided its own alert, air and surface, contingency forces (company/platoon reinforcement, amphibious raid, TRAP, NEO, HA/DR, and CASEVAC)."<sup>30</sup> The new LPD-17 class ship provides the MEU flexibility in assigning airframes to ships within the ARG. The LPD-17 class ship supports seven H-1s, four CH-53s, or three MV-22s. Any combination of these assets permits the ACE to task organize for the most likely mission and increase MEU capabilities across the range of military operations.

An examination of MEU operations from 1980 to 2010 reveals that over 60% of missions were humanitarian assistance and amphibious operations, which include amphibious assaults, demonstrations, and withdrawals; and stability operations.<sup>31</sup> Based on the President's guidance to DOD and historical evidence, it is reasonable to conclude that the most likely future missions for the MEU will be joint and international theatre security cooperation, humanitarian assistance/disaster

relief (HA/DR), stability operations, and maritime interdiction operations (MIO). The flexibility and ability to span across the spectrum of conflict assures the UH-1Y will play a major role in each of those missions. (See Appendix F)

The current high-profile mission set for a MEU is counter-piracy MIO off the Somalia coast. The subsets of MIO are visit, board, search, and seizure, seizure of static maritime gas-oil platforms, and selected maritime security missions. To conduct MIO a maritime raid force (MRF), of approximately 24 Marines specially trained to conduct this mission set, boards the target by a "bottom-up" approach on small boats, a "top-down" approach by helicopter insert (typically Fast Rope), or a combination of both sequentially or simultaneously. The threat and environmental specifics determine the boarding tactic.

Historically, the CH-46 was used to conduct the Fast Rope insertion of the MRF because it facilitates a rapid build-up of combat power as the MRF Fast Ropes from two points simultaneously from the aircraft. Additionally, the size of CH-46 permitted it to fit between obstacles, and the rotor downwash on the MRF was manageable. Traditionally, the UH-1 contributed to MIO by providing the Command and Control platform for the mission or MRF commander, clearing fires prior to the Joint Terminal Air Controller boarding the vessel (during top-down missions), and providing the platform for the aerial snipers to

deliver precision suppression fires. As a rule of thumb, MV-22 and CH-53 rotor downwash is prohibitive on vessels shorter than 65 feet. Additionally, the standard obstacles, including cranes, on ships and static platforms prevent the CH-53 and MV-22 from getting close enough to the target for Fast Rope insertion. If the MRF does not retain the top-down capability, the bottom-up tactic will be both predictable and disastrous. As the MV-22 replaces the CH-46, the UH-1Y will have to insert the MRF in addition to performing its traditional responsibilities, which requires an increase in the number of UH-1Ys deployed on the MEU.

Even with additional UH-1Ys on the MEU to bridge the gap between light utility and medium lift, there will be definite disadvantages. First, all cargo must be hand-loaded because forklifts are too tall to drive under the rotors that can have as little as five feet of clearance from the deck. Additionally, the standard cargo pallet does not fit inside the cabin of a UH-1Y. The Huey's weapons configuration does not allow for quickly loading or unloading. Finally, tasking the UH-1Y crews to assist the SH-60 in inter-ship passengers, mail, and cargo movements will interfere with tactical mission training.

An additional shipboard consideration is the limited space available for the ACE. The MV-22 is 3'8" wider and 230'

larger than the CH-46 it replaces. A full squadron of twelve MV-22s takes up 2,750 square feet more deck space than a squadron of CH-46s and displaces an additional 102 tons.<sup>32</sup> Recently, the F-35B Joint Strike Fighter STOVL variant was removed from probationary status and will be compatible with the current LHD (WASP) and LHA (TARAWA) class ships. Additionally, the F-35B JSF weighs more than the AV-8B and has unique ground support equipment. Substituting additional UH-1Ys for MV-22s will reclaim some of this additional weight.

Until a MEU is task-organized based on Combatant Commander, MEU Commanding Officer, and MEU ACE CO input, a recommended change to the ACE Table of Equipment is to deploy a MEU with ten MV-22s, four CH-53s, four AH-1Zs, five UH-1Ys, six AV-8Bs, and two SH-60s. The ACE maintains the ability to conduct a company-size lift with task organizing the ACE. Assuming a ten passenger capability for a CH-46, ten MV-22s still double the capability of twelve CH-46s. The increase in UH-1Ys can complement the MV-22 by performing "inner ring" assault support missions. This mix of aircraft maximizes assault support flexibility for the MEU's most likely missions: TSC, HA/DR, and stability operations. Additionally, even while conducting split ARG operations, the MEU can assign aircraft to shipping that maintains operational reach and reinforcement capability.

## Recommendations

"We have to become more efficient and make better use of taxpayer dollars in how we operate."

-Undersecretary of Defense Michelle Flournoy, May 14, 2010

The 2007 Center for Naval Analysis Marine Aviation Requirements Study (MARS 2007) determined that the future peacetime requirement is nine HMLA squadrons (eight active duty and one reserve). However, the MARS 2007 determined that in order to conduct a major theatre war, a small scale contingency, and provide a MEU detachment that the HMLA minimum requirements are 10.7 squadrons of AH-1Zs and 11.4 squadrons of UH-1Ys. In other words, the post-FSRG inventory of AH-1Zs and UH-1Ys will need to be increased to meet the requirements outlined in the President's Strategic Guidance 2012 and the Marine Corps is buying less than the required number of aircraft. The H-1 Upgrade POR consists of 349 aircraft when 385 aircraft are required to fill the squadrons of twenty-seven aircraft for a twenty-five year service life. The required number is higher because the expected service life for the H-1 Upgrade aircraft is thirty years, but for continuity the published number of 385 will be used.

	UH-1Y	AH-1Z	TOTAL
PAA	130	154	284
BAA	13	16	29
AA	33	39	72
RQMT	176	209	385
POR	160	189	349

The chart depicts PAA, which consists of Primary Mission Aircraft Inventory, Primary Training Aircraft Inventory, and Primary Development/Test Aircraft Inventory. Backup Aircraft Allowances (BAA) are additional aircraft to permit scheduled and unscheduled depot-level maintenance. Attrition Allowance (AA) are aircraft required to replace anticipated losses due to peacetime mishaps or wartime attrition.

The Marine Corps should continue to purchase and accept the aircraft in the POR contract. Subsequently, the Marine Corps should purchase the delta between the POR 349 aircraft and the required 385 aircraft. However, those thirty-six additional airframes should all be UH-1Ys. This recommendation is a compromise, balancing the future requirement while recognizing the current fiscal environment and honoring current contractual obligations. HMLA squadrons sourcing MEU detachments should be the priority for receiving these UH-1Ys.

#### Conclusion

"There is a requirement to tailor MAGTFs for the most likely missions while accepting risk against the least probable. Incremental improvements and 'business as usual' will not satisfy this objective."

-Marine Corps Operating Concepts, 2010

A modified HMLA PAA of twelve AH-1Zs and fifteen UH-1Ys optimizes tactical and operational effectiveness when considering the HMLA's contribution to the entire ACE and MAGTF

while meeting current and projected future assault support demands. Three additional UH-1Ys increase the HMLA's assault support capabilities by twenty-five percent. The offensive firepower tradeoff of sixty-four hard targets serviced by a Zulu versus sixty-three soft targets from a Huey with APKWS is inconsequential considering the forecasted hybrid threats.<sup>33</sup> However, the HMLA retains a formidable capability to service hard targets; twelve AH-1Zs have the equivalent fire power of the 'traditional' eighteen AH-1W squadron. By keeping the PAA at twenty-seven, the numbers of AH and UH aircraft in each HMLA remain divisible by three to support the Table of Organization built around three equal detachments.

The Marine Corps has a unique opportunity to restructure the HMLA from a force prepared for yesterday's threats to a force ready to meet the challenges of the 21st century. Cost, risk, and rotor downwash will prevent the MV-22 and CH-53 from performing light and low-end medium lift missions in the congested urban littorals in which the Marine Corps is forecasted to operate.<sup>34</sup> A fiscally responsible option is to fill this lift gap with additional UH-1Ys, a proven, multi-mission capable platform. APKWS II enhances the UH-1Y's lethality while maintaining utility capabilities. The Yankee/Zulu synergy provides a scalable option for uncertain environments across the range of military operations. The

President's strategic guidance and the forecasted hybrid threat warrant optimizing the HMLA's contribution to the MAGTF by restructuring to 12 AH-1Zs and 15 UH-1Ys, facilitating MEU detachments of 4/5.

## Notes

- <sup>1</sup> U.S. Marine Corps, Warfighting (MCDP-1) (Washington D.C.: GPO, 1997), 27.
- <sup>2</sup> U.S. Department of Defense. Sustaining U.S. Global Leadership: Priorities for 21st Century Defense. Washington, D.C.: Department of Defense, 2012, 5.
- <sup>3</sup> Ibid.
- <sup>4</sup> Ibid.
- <sup>5</sup> Ibid.
- <sup>6</sup> U.S. Marine Corps, Vision & Strategy 2025, (Washington, DC: Headquarters, U.S. Marine Corps, June 18, 2008), 10.
- <sup>7</sup> Ibid.
- <sup>8</sup> Ibid.
- <sup>9</sup> Noetic Corporation, The Evolved Irregular Threat Project, Paper for the Office of the Secretary of Defense. Washington, DC: Noetic Corporation, 2011, 25.
- <sup>10</sup> The ACE provides Marine tactical aviation for all MEU deployments. A standard ACE is built around a HMM or VMM of twelve CH-46E Sea Knights or MV-22B Ospreys, with detachments of four CH-53E Super Stallions, four AH-1W or Z Super Cobras, two or three UH-1Y Hueys, and six AV-8B Harriers. An additional detachment of two SH-60s perform Search and Rescue (SAR) and are not tasked to perform operational missions for the MEU.
- <sup>11</sup> MCO 3120.9C Policy for MEU and MEU(SOC) 4 Aug 2009, 4-7.
- <sup>12</sup> U.S. Marine Corps, "UH-1Y Training & Readiness Manual." (NAVMC 3500.2A) (Washington D.C. GPO, 2009). pg. 1-3.
- <sup>13</sup> The categories of assault support are Air Delivery, Air Evacuation, Air Logistical Support, Aerial Refueling, Battlefield Illumination, Combat Assault Support, and Tactical Recovery of Aircraft and Personnel (TRAP).
- <sup>14</sup> U.S. Marine Corps, "UH-1Y Training & Readiness Manual." (NAVMC 3500.2A) (Washington D.C. GPO, 2009). pg. 1-3.
- <sup>15</sup> House Committee on Armed Services, Department of the Navy's Aviation Procurement Program, March 15, 2011, 13-14,  
[http://armedservices.house.gov/index.cfm/files/serve?File\\_id=32f26e0b-9f9e-4283-94ae-0a12eaae2863](http://armedservices.house.gov/index.cfm/files/serve?File_id=32f26e0b-9f9e-4283-94ae-0a12eaae2863) (accessed January, 2012).
- <sup>16</sup> The six functions of Marine aviation are Air Reconnaissance, Anti-Air Warfare, Control of Aircraft and Missiles, Electronic Warfare, Offensive Air Support, and Assault Support.
- <sup>17</sup> U.S. Marine Corps. Marine Corps Operating Concepts Assuring Littoral Access...Proven Crisis Response, 3d ed. (Washington D.C.: GPO, 2010), 40.
- <sup>18</sup> LtGen Terry Robling, "The Spectrum of the Possible: The MV-22 Gives the MAGTF Commander Needed Flexibility," Marine Corps Gazette, January 2012, 11.
- <sup>19</sup> Dakota L. Wood, The Future of the MV-22 Osprey, Testimony Before the U.S. House of Representatives Committee on Oversight and Government Reform, (Washington D.C.: Center for Strategic and Budgetary Assessments, May 21, 2009), 4,  
<http://democrats.oversight.house.gov/images/stories/documents/20090623103619.pdf> (accessed March 2012).
- <sup>20</sup> Whitney, Bradley & Brown, Inc., HMLA Squadron Aircraft Mix Analysis and Operational Assessment. Reston, VA: WBB, 2011, 16.

- <sup>21</sup> Senate Armed Services Committee (Budget Request). Opening Summary -- As Delivered by Secretary of Defense Robert M. Gates. Washington, D.C., February 2, 2010. <http://www.defense.gov/speeches/speech.aspx?speechid=1417> (accessed February 18, 2011).
- <sup>22</sup> The Wall Street Journal. "Advanced Precision Kill Weapon System Aces Helicopter Testing." [marketwatch.com](http://www.marketwatch.com), November 9, 2011. <http://www.marketwatch.com/story/advanced-precision-kill-weapon-system-aces-helicopter-testing-2011-11-09> (accessed November 9, 2011).
- <sup>23</sup> Whitney, Bradley & Brown, Inc., HMLA Squadron Aircraft Mix Analysis and Operational Assessment. Reston, VA: WBB, 2011, 14.
- <sup>24</sup> LtCol Paul Ryan, "Interview with LtCol Paul Ryan, Commanding Officer VMM-263 (Reinforced)," by Jeffrey Aivaz, Marine Corps Center for Lessons Learned, April 2, 2009.
- <sup>25</sup> Tony Capaccio, "V-22 Osprey Aircraft's Reliability Improves in Pentagon Testing," *Businessweek*, January 2012, <http://www.businessweek.com/news/2012-01-19/v-22-osprey-aircraft-s-reliability-improves-in-pentagon-testing.html> (accessed January 19, 2012).
- <sup>26</sup> Whitney, Bradley & Brown, Inc., HMLA Squadron Aircraft Mix Analysis and Operational Assessment. Reston, VA: WBB, 2011, 16.
- <sup>27</sup> LtGen Terry Robling, "The Spectrum of the Possible: The MV-22 Gives the MAGTF Commander Needed Flexibility," *Marine Corps Gazette*, January 2012, 12.
- <sup>28</sup> House Committee on Armed Services, Department of the Navy's Aviation Procurement Program, March 15, 2011, 14, [http://armedservices.house.gov/index.cfm/files/serve?File\\_id=32f26e0b-9f9e-4283-94ae-0a12eaae2863](http://armedservices.house.gov/index.cfm/files/serve?File_id=32f26e0b-9f9e-4283-94ae-0a12eaae2863) (accessed January, 2012).
- <sup>29</sup> LtCol Tye Wallace, "The 21st Century MEU," *Marine Corps Gazette*, February 2011, 74.
- <sup>30</sup> Ibid.
- <sup>31</sup> Col Roy Osborn, "Future MEU ACE" (Draft, OAG Brief, November 2011), 6.
- <sup>32</sup> Maj Roger Smith, "Building a Better ACE: Restructuring the Marine Expeditionary Unit's Air Combat Element in the MV-22 Era," (Masters Thesis, Marine Corps University, 2009), 3.
- <sup>33</sup> U.S. Marine Corps, *Vision & Strategy 2025*, (Washington, DC: Headquarters, U.S. Marine Corps, June 18, 2008), 14.
- <sup>34</sup> Ibid.

# Appendix A

CH-46E		MV-22	
Dimensions:		Aircraft type / models	MV-22B
Height	16 feet 8 inches	Dimensions:	
Weight	16,500 pounds (empty)	Height	27 feet 7 inches
	24,300 pounds (max gross weight)	Weight	34,000 pounds (empty)
Rotor diameter	51 feet		52,600 (VTO) / 57,000 (STO) 60,500 (self-deploy)
Length	84 feet 4 inches	Width	84 feet 7 inches
Airspeed:		Length	57 feet 4 inches
Max endurance	70-90 KIAS	Airspeed:	
Max range	110 to 130 KIAS	Max endurance	130 KCAS
Max airspeed	145 KIAS	Max range	215 KCAS
Fuel capacity:		Max airspeed	280 KCAS
Pounds	4,488 pounds	Fuel capacity:	
Gallons	660 gallons	Pounds	11,700 pounds
Payloads	2,200-4,500 pounds fuel / configuration dependant	Gallons	1,720 gallons
	15 litters max (12 litters combat)	Payloads	12,500 pounds (internal / external)
Endurance	3+00		12 litters
weapons systems:		Endurance	3+00, AAR Capable
		Weapons systems:	GAU-16 .50 Cal or M240D 7.62 tailgun, belly mounted GAU-17
Guns	2 x .50 cal XM-218	Other systems	GPS, FLIR
Other systems	1 x M240D 7.62 mm tailgun	Communication equipment:	
Communication equipment:	GPS / ANAY-28	DF / SATCOM /	
VHF / UHF	2 x AN / ARC-210 (with KY-58 encryption device)	FM HOME HQ / VHF /	
Aircraft survivability equipment:		UHF / SINCGARS	2 x AN / ARC-210 (with KY-58 encryption device)
RWR	AN / APR-39(V)1 radar warning reciever	Aircraft survivability equipment:	
IRCM	AN / ALQ-157 infrared jammer	RWR	AN / APR-39(V)2 radar warning reciever
Expendables	AN / ALE-47 countermeasures dispenser	Expendables	AN / ALE-47 countermeasures dispenser
Missile warning	AN / AAR-47(V2) missile warning system	Missile warning	AN / AAR-47 missile warning system

# Appendix A

CH-53		
Aircraft type / models	CH-53D	CH-53E
Dimensions:		
Height	24 feet 11 inches	28 feet 4 inches
Weight	28,000 pounds	43,800 pounds
	42,000 pounds	73,500 pounds
Rotor diameter	72 feet 3 inches	79 feet
Length	88 feet 6 inches	99 feet .5 inches
Airspeed:		
Max endurance	120 KIAS	120 KIAS
Max range	115-130 KIAS	130-140 KIAS
Max airspeed	130 KIAS	150 KIAS
Fuel capacity:		
Pounds	13,178 pounds	15,500 pounds
Gallons	1,938 gallons	2,277 gallons
		3 x 5,000 pound TBFDs
Payloads	26 seats	27 seats
	40 seats w/ centerline	41 seats w/ centerline
	20,000 pounds external	36,000 pounds external
	24 litters max	24 litters max
Endurance: Typical	3+15 hours	3+30 hours (HAAR capable)
Endurance: Best case	4+30	4+30
Weapons systems:		
Guns	2 x .50 cal XM-218 or 2 x GAU-21 / .50 cal tailgun	
Other systems	GPS, FLIR(E), HUD(E)	
Communication equipment:		
HF	1 x AN / ARC-94 or AN / ARC-174	
VHF / UHF	2 x AN / ARC-210 with KY-58 for encryption	
SATCOM		
EDM	1 x ANAY-28(V)2	
Aircraft survivability equipment:		
RWR	AN / APR-39(V)1 radar warning receiver	
Expendables	AN / ALE-47 countermeasure dispenser	
Missile warning	AN / AAR-47V2 MWS	
IRCM (CH-53D only)	AN / ALQ-157 infrared jammer	
DIRCM	AAQ-24	

UH-1Y	
Aircraft type / models	UH-1Y
Dimensions:	
Height	14 feet 7 inches
Weight	18,500 pounds (max gross weight)
Rotor diameter	48 feet
Width (folded)	15 feet 1 inch
Length	58 feet 4 inches
Airspeed:	
Cruise	120-140 KCAS stores dependent
Max endurance	60-70 KCAS
Max airspeed	170 KCAS
Fuel capacity:	
Pounds	2,650
Gallons	386
Endurance:	2+15 (flight profile / mission dependent)
Weapons systems:	
Guns	7.62mm GAU-17
	7.62mm M240D
	.50 cal GAU-16
Rockets	LAU-61 (2.75 inch rockets, 19-shot pod)
	LAU-68 (2.75 inch rockets, 7 shot pod)
Typical mission configuration:	
Ordnance	(14) 2.75 inch rockets; GAU-16 / GAU-17
Pax	5 in standard seat configuration, 6 without rucks in seats, 6 with rucks with combat securing gear, 8 administrative without ordnance
Other systems:	
Miscellaneous	UAV / AV-8B remote receiving station
Comm jamming	AN / ULQ-19
GPS	
FLIR	AN / AAQ-22C STAR SAFIRE with LRF
	AN / AAQ-22D BRITESTAR with LRF, LTD, and color CCD
Communication:	
VHF / UHF	3 x AN / ARC-210 with KY-58 encryption device
SATCOM	Wideband (non-DAMA)
Miscellaneous	ASE-26 communication package
	C3 mission kit (ROVER/mIRC via PRC-117 F/G)
Aircraft survivability equipment:	
RWR	AN / APR-39B(V)2 warning receiver
IRCM	AN / ALQ-144(V)1A
Expendables	AN / ALE-47 countermeasure dispenser
Missile warning	AN / AAR-47(V)2 missile warning system

# Appendix A

AH-1W	
Aircraft type / models	AH-1W
Dimensions:	
Height	13 feet 9 inches
Weight	10,850 pounds (average empty) 14,750 pounds (max gross weight)
Rotor diameter	48 feet
Fuselage width	3 feet 7 inches
Length	58 feet 0 inches
Airspeed:	
Max endurance	68 KIAS
Max airspeed	170 KIAS (with wing stores)
Fuel capacity:	
Pounds	2,000 pounds total
Gallons	304 gallons total
Endurance:	2+00
Payload	2,000 pounds (in addition to full internal fuel)
Typical	2.1 hours
Best case	2.3 hours / 4.0 hours (with 2 aux fuel tanks)
Worst case	1.8 hours / 3.2 hours (with 2 aux fuel tanks)
Weapons systems:	
Missiles	BGM-71 A / A-1 / C / D / E TOW / AGM-114A / B / C / K / F / M / N Hellfire /
Guns	AIM-9 SIDEWINDER 20mm Turret (+110 azm, +111 elev, +/-50 deg) / 20mm ammo (M 50 series, PGU 27 / 28 / 30 series)
Rockets	LAU-10 / 61 / 68
Typical mix	
AAW	2 x AIM-9, 2.75-inch flechette, TOW, 20 mm
OAS	Hellfire, TOW, 5-inch and 2.75-inch rockets, 20mm
ESCORT	Sidewinder, 2.75-inch RP / HE, 20mm, (TOW / Hellfire)
FAC(A)	Hellfire, TOW, 2.75-inch RP, 20mm
Other systems:	
FLIR	Night Targeting System contains 25 x targeting FLIR
Laser	Pulsed, 1064 nm, neodymium: YAG, laser designator and range system
TV	34 x charge coupled device TV camera
VCR	Super VHS and VHS recording capability
Optics	13 x direct view optics
Other	20mm mounted IZLID-1000
Communications equipment:	
VHF / UHF	2 x AN / ARC-210 with KY-58 encryption device
Aircraft survivability equipment:	
RWR	AN / APR-39(V)2 warning receiver
IRCM	AN / ALQ-144A(V)1
Expendables	AN / ALE-47 countermeasures dispenser
Missile warning	AN / AAR-47 missile warning system

AH-1Z	
Aircraft type / models	AH-1Z
Dimensions:	
Height	14 feet 4 inches
Weight	11,850 pounds (average empty) 18,500 pounds (max gross weight)
Rotor diameter	48 feet
Fuselage width	14 feet 6 inches (includes wing stubs)
Length	58 feet 3 inches
Airspeed:	
Max airspeed	200 KIAS
Fuel capacity:	
Pounds	2,800 pounds total
Gallons	412.5 gallons total
Endurance:	2+00 to 2+30 depending on configuration
Payload	2,000 pounds (in addition to full internal fuel)
Typical	2.3 hours with full mission load
Best case	3.0 hours
Worst case	2.0 hours
Weapons systems:	
Missiles	AGM-114A / B / C / K / F / M / N Hellfire / AIM-9 SIDEWINDER
Guns	20mm Turret (+110 azm, +111 elev, +/-50 deg) / 20mm ammo (M50 series, PGU 27 / 28 / 30 series)
Rockets	LAU-61 / 68 (2.75")
Typical mix	
AAW	2 x AIM-9, 2.75-inch flechette, HF, 20 mm
OAS	Hellfire, 2.75" rockets, 20mm
Escort	Sidewinder, 2.75-inch RP / HE, 20mm, (Hellfire)
FAC(A)	Hellfire, 2.75-inch RP, 20mm
Other systems:	
Target sight system	TSS
FLIR	3-5 micron
Laser	Pulsed, 1064 nm, neodymium: YAG, laser designator and range system with eye safe mode
TV	Full color TV camera
VCR	8mm recording capability
Communications equipment:	
VHF / UHF	2 x AN / ARC-210 with KY-58 encryption device
Aircraft survivability equipment:	
RWR	AN / APR-39(V)2 warning receiver
Expendables	AN / ALE-47 countermeasures dispenser
Missile warning	AN / AAR-47 missile warning system

# Appendix B

1 FFGX 13 AH-1W/O LH-1Y  
5 AH-1Z/B OH-1Y  
SAR 3 XH-1Y (Yuma)  
4 XH-146E (Cherry Point)

SAR 3 XH-1Y (Yuma)  
3 XH-1Y (Cherry Point)

		FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	
		1	2	3	4	1	2	3	4	1	2	3	4
UNIT LOCATION	PMAT												
MAG-49													
HMLA-167 (1 & 2)	15 AH-1Z OH-1Y	Y											
HMLA-369	15 AH-1Z OH-1Y												
HMLA-469	15 AH-1Z OH-1Y	Y				Z				Z			
HMLA-267	15 AH-1Z OH-1Y												
HMLA-169	15 AH-1Z OH-1Y	Y						Z					
MAG-29													
HMLA-167	15 AH-1Z OH-1Y		Y							Z			
HMLA-369	15 AH-1Z OH-1Y			Y						Z			
HMLA-467 (1)	15 AH-1Z OH-1Y				Y						Z		
MAG-24													
HMLA-167 (1 & 2)	15 AH-1Z OH-1Y										Z		
MAG-49													
HMLA-373	15 AH-1Z OH-1Y				Y						Z		
SAR													
Yuma SAR	11 OH-1Y					Y							
Cherry Point SAR	11 OH-1Y							Y					

Y = YANKEE TRANSITION BEGINS  
Z = ZULU TRANSITION BEGINS  
B = SIMULTANEOUS TRANSITION  
V = TRANSITION COMPLETE

## NOTES:

- 1) HMLA-367 RELOCATES TO MCAS KANGAROO BAY, IOC 1<sup>st</sup> QTR FY13, FOC 1<sup>st</sup> QTR FY15.
- 2) HMLA-367 SOURCES FIRST TWO AH-1Z/OH-1Y MEU DETS WHILE MAINTAINING AH-1W. HMLA-367 WILL RETAIN FIVE AH-1W AND FOUR OH-1Y FOR RELOCATION TO HAWAII.
- 3) HMLA-467 TEMPORARILY BASED IN CHERRY POINT AND MOVES TO NEW RIVER IN FY14.

\*\*Basing plans are subject to change and further environmental analysis\*\* 2-12



Marine Aviation

## AH-1 Shortfall Snapshot

(End of FY12)



Category	Squadron	Location	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
AH-1W	HMLA-169	Pendleton																		
AH-1W	HMLA-367	Pendleton																		
AH-1W	HMLA-369	Pendleton																		
AH-1W	HMLA-469	OEF																		
AH-1W	HMLAT-303	Pendleton																		
AH-1W	HMLA-167	New River																		
AH-1W	HMLA-269	New River																		
AH-1W	HMLA-467	New River																		
AH-1W	31st MEU	Okinawa																		
AH-1W	Reserves	Various																		
AH-1W	Test	Various																		
Category	Squadron	Location	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
AH-1Z	HMLAT-303	Pendleton																		
AH-1Z	HMLA-267	Pendleton																		
AH-1Z	Test	Various																		

Interim Maintenance Program (IMP) F&E and fleet modification  
further reduce aircraft availability by 1-2 AH-1Ws per unit  
(AH-1W deficit recovery in FY14)

## MEU

### Amphibious Operations

MCT 1.3.2.3	Conduct Amphibious Assault
MCT 1.3.2.2	Conduct Amphibious Raid
MCT 1.3.2.8	Conduct Maritime Interception Operations (MIO)
MCT 1.6.10	Conduct Advance Force Operations

### Expeditionary Support to Other Operations / Crisis Response and Limited Contingency Operations

MCT 1.6.6.6	Conduct Noncombatant Evacuation Operations (NEO)
MCT 1.6.6.7	Conduct Humanitarian Assistance (HA)
MCT 1.6.6.9	Conduct Stability Operations (SO)
MCT 6.2.1	Conduct Tactical Recovery of Aircraft and Personnel (TRAP)
MCT 5.5	Conduct Joint and Combined Operations
MCT 1.3.3.3.2	Conduct Aviation Operations From Expeditionary Shore-Based Sites
MCT 1.6.5.6	Conduct Airfield/Port Seizure

## HMM (CH-46)

### Core METL

MCT 1.3.3.3.1	Conduct Aviation Operations From Expeditionary Sea-Based Sites
MCT 1.3.3.3.2	Conduct Aviation Operations From Expeditionary Shore-Based Sites
MCT 1.3.4.1	Conduct Combat Assault Transport
MCT 4.3.4	Conduct Air Delivery
MCT 6.2.1.1	Conduct Aviation Support of Tactical Recovery of Aircraft and Personnel (TRAP)
MCT 6.2.2	Conduct Air Evacuation

### Core Plus MET

MCT 1.3.4.1.1	Conduct Airborne Rapid Insertion/Extraction
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## VMM (MV-22)

### Core METL

MCT 1.3.3.3.1	Conduct Aviation Operations From Expeditionary Sea-Based Sites
MCT 1.3.3.3.2	Conduct Aviation Operations From Expeditionary Shore-Based Sites
MCT 1.3.4.1	Conduct Combat Assault Transport
MCT 4.3.4	Conduct Air Delivery
MCT 6.2.1.1	Conduct Aviation Support of Tactical Recovery of Aircraft and Personnel (TRAP)
MCT 6.2.2	Conduct Air Evacuation

### Core Plus MET

MCT 1.3.4.1.1	Conduct Airborne Rapid Insertion/Extraction
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## HMH (CH-53E)

### Core METL

MCT 1.3.3.3.2	Conduct Aviation Operations From Expeditionary Shore-Based Sites
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## Appendix D

MCT 1.3.4.1	Conduct Combat Assault Transport
MCT 4.3.4	Conduct Air Delivery
MCT 6.2.1.1	Conduct Aviation Support of Tactical Recovery of Aircraft and Personnel (TRAP)
MCT 6.2.2	Conduct Air Evacuation
<u>Core Plus METs</u>	
MCT 1.3.3.3.1	Conduct Aviation Operations From Expeditionary Sea-Based Sites
MCT 1.3.4.1.1	Conduct Airborne Rapid Insertion/Extraction
MCT 1.3.4.2.1	Provide Aviation-Delivered Ground Refueling

### HMLA (AH-1 and UH-1Y)

#### Core METL

MCT 1.3.3.3.2	Conduct Aviation Operations From Expeditionary Shore-Based Sites
MCT 3.2.3.1.1	Conduct Close Air Support
MCT 3.2.3.1.2.2	Conduct Armed Reconnaissance
MCT 3.2.3.1.2.3	Conduct Strike Coordination and Reconnaissance
MCT 3.2.5.4	Conduct Forward Air Control (Airborne)
MCT 6.1.1.11	Conduct Aerial Escort
MCT 6.2.1.1	Conduct Aviation Support of Tactical Recovery of Aircraft and Personnel (TRAP)

#### Core Plus METs

MCT 1.3.3.3.1	Conduct Aviation Operations From Expeditionary Sea-Based Sites
MCT 6.1.1.8	Conduct Active Air Defense

### AH-1 Specific

#### Core METL

MCT 3.2.3.1.2.1	Conduct Air Interdiction
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#### Core Plus METs

MCT 3.2.3.2	Conduct Offensive Anti-Air Warfare
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### UH-1 Specific

#### Core METL

MCT 1.3.4.1	Conduct Combat Assault Transport
MCT 4.3.4	Conduct Air Delivery
MCT 5.3.2.7.4	Provide an Airborne Command and Control Platform for Command Elements
MCT 6.2.2	Conduct Air Evacuation

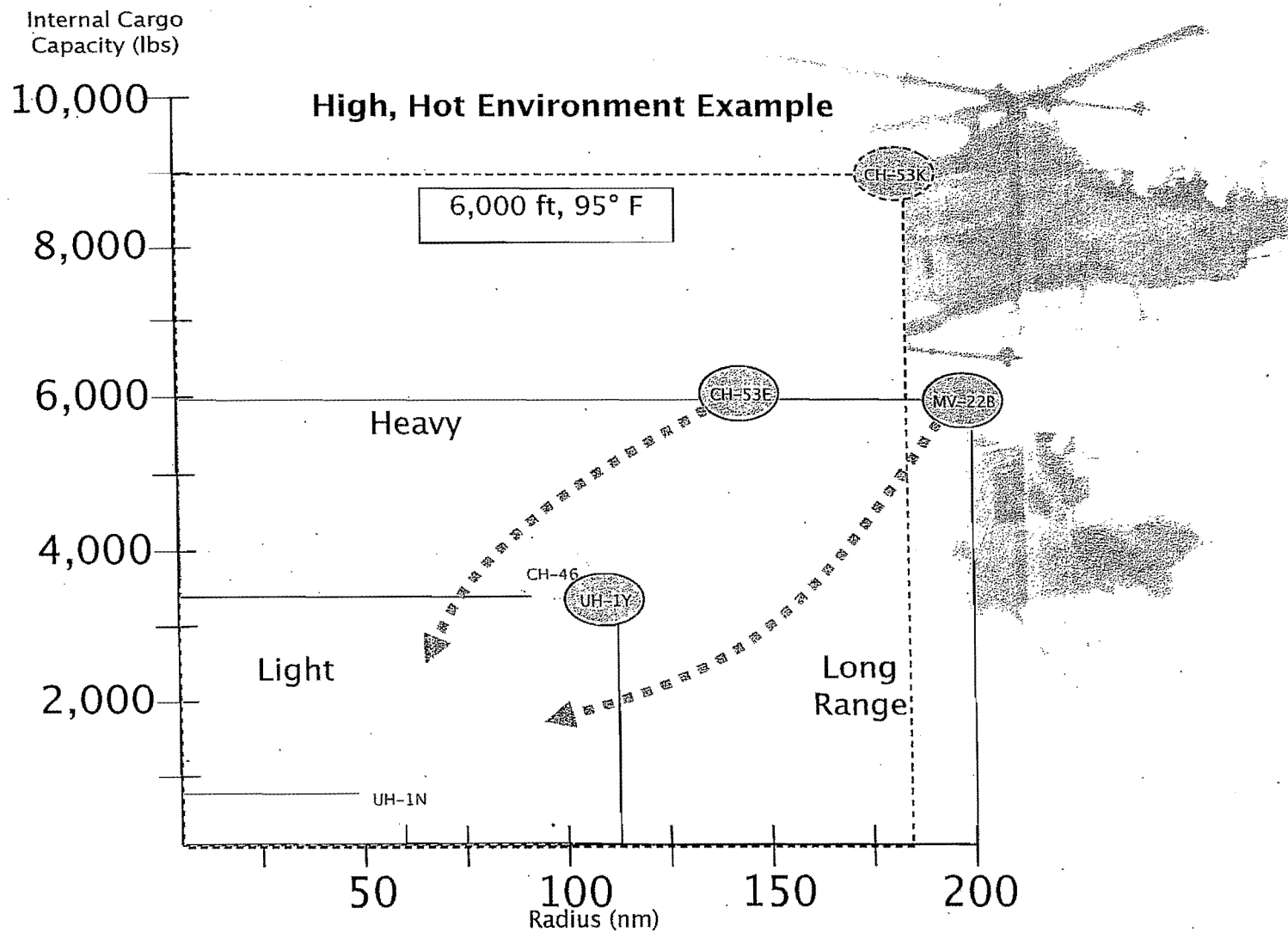
#### Core Plus METs

MCT 1.3.4.1.1	Conduct Airborne Rapid Insertion/Extraction
MCT 5.3.2.7.3	Conduct Tactical Air Coordination (Airborne)

## Helicopter Landing Zone Sizes

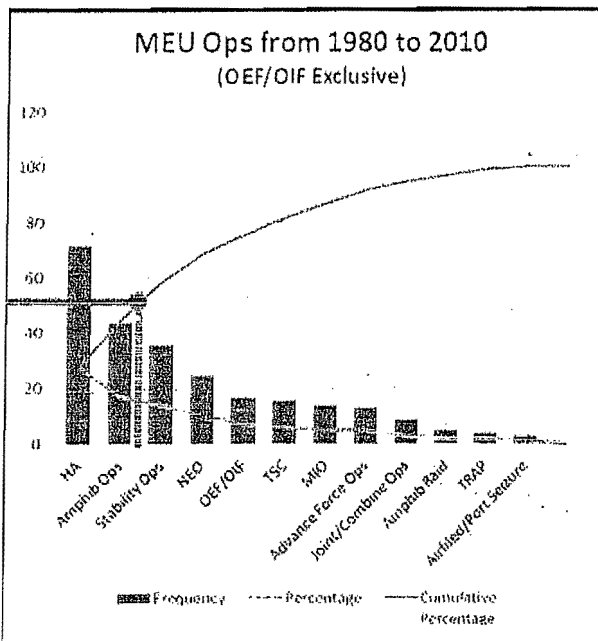
TYPE	LZ SIZE (LxW)		OTHER CONSID.
	SINGLE	SECT. (2 A/C)	
CH-53	200' X 300'	300' X 400'	LARGE ROTOR WASH
CH-46	100' X 100'	200' X 200'	CAPABLE OF SEMI-ROUGH TERRAIN LANDING
MV-22	160' X 180'	310' X 330'	LARGE ROTOR WASH
UH-60	100' X 100'	200' X 200'	MEDEVAC -UNARMED
UH-1	75' X 100'	150' X 150'	VARIETY OF MSN / ORD
AH-1W (ESCORTS ONLY )	75' X 100'	150' X 150'	NARROW SKIDS REQUIRE FLAT, SMOOTH SURFACE

## Appendix F Assault Support Efficiency



# MEU Ops from 1980 to 2010<sup>1</sup>

(OEF/OIF Exclusive)



MEU METL	Frequency	Percentage	Cumulative Percentage
HA	72	28	28
Amphib Ops <sup>2</sup>	44	17	45
Stability Ops	36	14	59
NED	25	10	69
OEF/OIF	17	7	76
TSC <sup>3</sup>	16	6	82
MIO	14	5	87
Advance Force Ops	13	5	92
Joint/Combine Ops	9	3	95
Amphib Raid	5	2	97
TPAP	4	2	99
Airfield/Port Seizure	3	1	100
Avi Ops from expeditionary shore based sites	0	0	100
<b>Total</b>	<b>258</b>	<b>100</b>	<b>100</b>

**Fifty percent of missions were Humanitarian and Amphibious Ops.**

1. Data taken from CNA studies, HQMC History & Museums Div, U.S. Naval Institute, and PP&O.
2. Although not a METL, and for the purpose of this brief, Amphib Ops includes assault, demonstration, & withdrawal.
3. Based on data used, TSC was not categorized until 2007.

Source: "Future MEU ACE." Draft, OAG Brief, November 2011

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### Interviews Conducted

Maj D.C. Sanders, MAGTF Planner, HQMC Aviation; Plans, Concepts, and Integration (APP-5X). Personal Interview January 2011.

LtCol J.M. Isaacs, Future Commanding Officer HMLA-169. Personal Interview February 2012.